CEROCOCCUS MICHAELI (HEMIPTERA: CEROCOCCIDAE): A NEW SPECIES OF FALSE PIT SCALE FROM NEW ZEALAND[1]

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ABSTRACT: A new species of pit scale insect, *Cerococcus michaeli*, from New Zealand is described and illustrated. *Cerococcus michaeli* represents the second indigenous species to New Zealand and the eighth species from the Australian Region in the genus. This species is distinguished from other species in the genus by the presence of an anal shield with a dorsal opening, spine-like apical setae on anal lobes, the occurrence of asteroform tubular ducts, and the absence of multilocular pores in transverse abdominal rows on the ventrum. A modified key is provided to separate *C. michaeli* from other known species in this taxon.

Species of false pit scales (Cerococcidae) are represented in all major zoogeographical regions, however, most are found in the tropical and subtropical areas. Several species are considered important pests of agricultural crops and ornamentals (Lambdin and Kosztarab 1977). Of the 56 species assigned to the genus *Cerococcus*, only one species, *C. corokiae* (Maskell), has been described from New Zealand. Recently, a new species was found while examining a series of unidentified scale insect material from the coccoidea collection of the National Museum of Natural History, Washington, D.C., USA. This species represents the eighth species known from the Australian Region in this genus.

This new species is placed in the genus *Cerococcus* based on measurements and observations on 37 morphological characteristics of the adult female. The structures evaluated are considered common to species in this genus (Borchsenius 1959, Danzig 1980, Lambdin & Kosztarab 1977). Specifically, the presence of dorsal 8-shaped pores, prominent anal lobes, a triangular anal shield, and cribriform plates are consistent structures for this taxon. In addition, this species has a three-segmented labium, one segmented antennae, bilocular pores, submarginal spiracles and associated spiracular furrows lined with quinquelocular pores on the ventrum. All measurements are rounded to the nearest micrometer. Where possible, 10 measurements of each structure were taken and are presented as an average followed by the range in parentheses. Terminology follows Lambdin and Kosztarab (1977).

Cerococcus michaeli, NEW SPECIES

(Fig. 1a-k)

Type Locality. Coromandel, New Zealand.

Type-Material. Holotype adult (encircled, lower center) and 4 paratype on 1 slide (No. 1651), on *Dysoxylum spectabile*, Coromandel, New Zealand,

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Description of Slide-mounted Adult Females

Body (Fig. 1a) pear shaped, membranous, 732 (650-820) long, 464 (410-540) wide; with distinct anal cleft; anal lobes (Fig. 1b) elongate, with scale-like overlapping cells, 88 (78-90), long, 49 (48-50) wide, each lobe with an outer (conical) and inner (needle-like) subapical seta, each 7 (6-12), and an stout apical seta (needle-like) 11 (10-12) long.

Dorsal Surface (Left half)

Anal shield (Fig. 1a,b) triangular, with enclosed anterior anal opening, plate 69 (65-75) long, 54 (52-55) wide. Anal ring (Fig. 1a,b) minute, 12 (12-13) in diam., with 6 fleshy setae, each 18 (14-21) long. Cribriform plates (Fig. 1c) unevenly aerolated, 2 pairs, 1 pair each located on segments 7-8 anterior to anal lobes and triangular plate; each 5 (4-7) in diam. 8-shaped pores (Fig. 1d) sparse, appearing to form a swirled pattern on derm with subcircular areas devoid of pores, each 4 (3-5) long, 2 (2-3) wide. Setae (Fig. 1e) sparse, few submedial tack-like setae in longitudinal rows, especially on 6th - 9th abdominal segments, each 2 (2-3) long, other setae rare. Simple disc pores absent. Tubular ducts (Fig. 1f) asteroform, inner ductule reduced, invaginated inner end with 1-3 minute teeth, outer ductule long and slender; scattered throughout derm, more numerous in marginal areas, especially in posterior abdominal region; each 21 (18-25) long, 1 (1-2) wide.

Ventral Surface (Right Half)

Antennae (Fig. 1g) one segmented, 10 (8-12) long, 9 (6-15) wide; with 6 (4-7) setae. No associated quinquelocular pores (Fig. 1h) at base. Bilocular pores (Fig. 1i) subcircular, irregularly spaced, most numerous in submarginal area of cephalothorax, especially around mouthparts, antennae, and spiracles; few occasionally on margin of abdominal segments, each 4 (3-5) in diameter. Clypeolabral shield rectangular, 138 (134-140) long, 115 (112-118) wide. Marginal band of 8-shaped pores (Fig. 1d) extending around body to apex of anal lobes and in transverse rows, one pore wide, on abdominal segments; each 4 (3-5) long, 2 (2) wide. Labium three-segmented, triangular, 54 (51-58) long, 55 (51-58) wide; with 5 (5-6) pairs setae, each 5 (3-6) long. Legs absent. Spiracles (Fig. 1j) located in submarginal area, 29 (28-31) long, 11 (11-12) wide, atrial diameter 4 (3-5); spiracles and spiracular furrows with associated quinquelocular pores, few 4-7 locular pores; anterior spiracle with lateral cluster of 9 (7-11) pores, spiracular furrow with 21 (15-30) pores extending from spiracle to margin; posterior furrows bifid, cluster of 8 (6-10) pores associated with spiracle, 7 (3-11) pores in anterior branch of spiracular furrow and 3 (2-5) pores in posterior branch, each pore 4 (4-5) in diam. Multilocular pores absent. Setae (Fig. 1k) sparse, tack-like, in segmental transverse rows, 3 pairs associated with vulva, 3 medial pairs between antennae, and a seta associated with each spiracle, each 2 (2-3) long. Tubular ducts (Fig. 1f) similar in shape and size to those on dorsum, but fewer on ventrum. Vulva large, ca. 50 in diam., largest among known cerococcids.

Etymology. This species is named for my son, Michael, in tribute to his interests in insects.

DISCUSSION

Morphological similarities of *C. michaeli* to other species in the genus *Cerococcus* include: a similar body shape (pyriform), a long anal cleft and triangular anal shield, cribriform plates, and 8-shaped pores on the dorsum. Ventrally, this species has a three segmented labium, one segmented antennae, and a pair of thoracic spiracles with a bifid posterior furrow lined with quinquelocular pores. Also, the type of pores (bilocular, quinquelocular, and 8-shaped) and their arrangement on the ventrum are also similar to those of other species in the genus. This species is easily distinguished from other species by the presence of an asterolecaniid type of tubular duct. This is the first cerococcid known to have such tubular ducts. The long outer ductile has

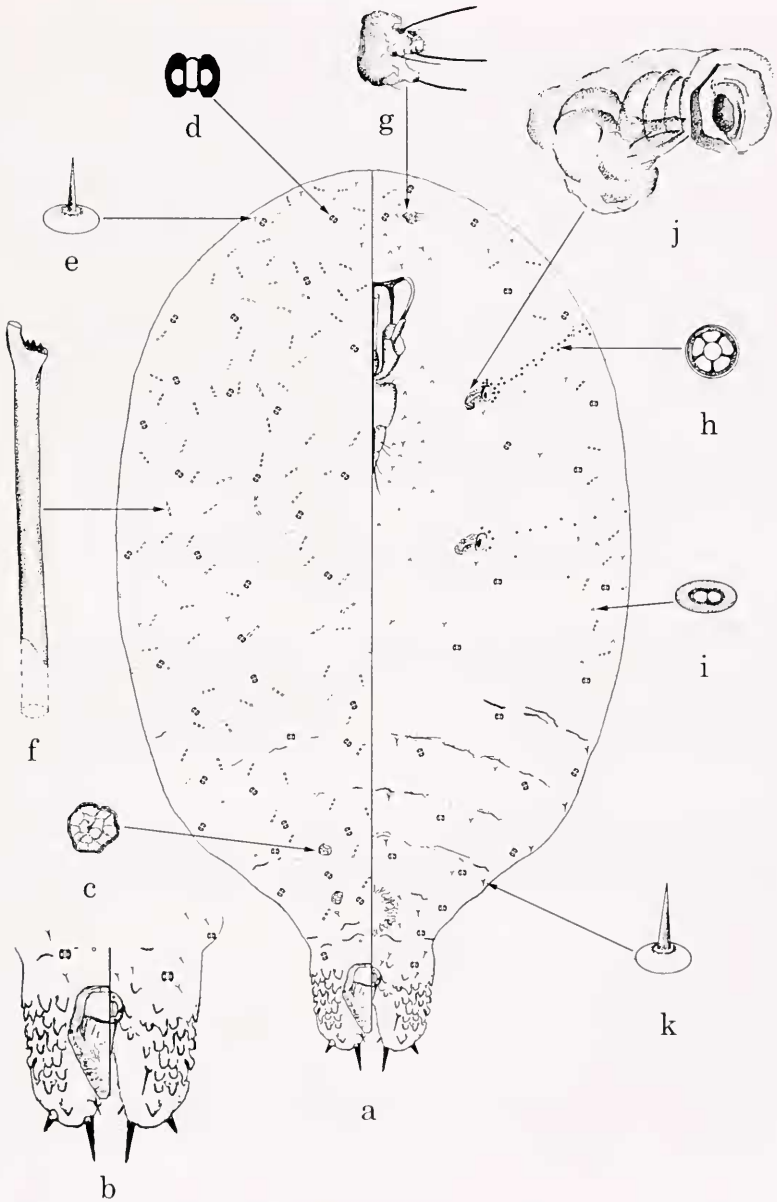

Fig. 1. *Cerococcus michaeli* Lambdin, n. sp.: (a) dorsoventral view; (b) anal lobes and anal shield; (c) cribriform plate; (d) 8-shaped pore; (e) dorsal seta; (f) tubular duct; (g) antenna; (h) quinquelocular pore; (i) bilocular pore; (j) spiracle; (k) ventral seta.

been reduced, but there are one to three teeth within the cup. Also, the anal shield differs somewhat from those typically exhibited by other species of false pit scales. There exists an opening near the anterior margin of the anal shield for waste elimination and the shield curves ventrad, but does not join medially. The minute anal ring is enclosed by the anal shield and has six slender anal ring setae. Of the 56 known species in the taxa, only one other species, *C. gallicolus* Mamet, from Madagascar is known to have six setae. Also, there is a lack of quinquelocular pores at the base of the antennae and multilocular pores on the ventral abdominal segments. In addition, these segments are distinguished by a transverse row of 8-shaped pores.

The other endemic species to New Zealand, *C. corokiae* (Maskell), is distinguished from this species by the presence of more numerous cribriform plates, an anal ring with eight setae, an anal shield without an opening, two sizes of 8-shaped pores, presence of a submarginal row of quinquelocular pores extending from the antennae to the posterior spiracles, and multilocular pores in transverse abdominal rows. *C. michaeli* possess some of the more primitive traits observed in species assigned to this genus (scale-like anal lobes, the unevenly aerolated cribriform plates, and perhaps the tubular ducts).

This new species may be identified using a modified key (Lambdin and Kosztarab 1977) to the adult females of *Cerococcus* as follows:

32. Without quinquelocular pores at base of each antenna 32a
With quinquelocular pores at base of each antenna 33

32a. Posterior spiracular furrows absent; anal shield without dorsal opening; 1-segmented leg stubs present; with multilocular pores in transverse abdominal rows .... *indonesiensis*
Posterior spiracular furrows present; anal shield with dorsal opening; 1-segmented leg stubs absent; without multilocular pores in transverse abdominal rows ..... *michaeli*

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